Claim 1 recites:

> A method for controlling an internal combustion engine, comprising: controlling a fuel injection using a control element, the fuel injection being divided into at least a first partial injection and a second partial injection, a start of triggering of the second partial injection taking place a preselected first time period after an end of triggering of the first partial injection.

The Creighton reference does not disclose "a start of triggering of the second partial injection taking place a preselected first time period after an end of triggering of the first partial injection." Instead, the Creighton reference discloses determining the starting time of main injection for a current engine cycle to predict the starting time of the main injection for the next cycle, then, using the predicted starting time, computing a starting time of the pilot injection for the next cycle based on a desired fixed time interval. It should be noted that the predicted starting time and the actual starting time of the main injection will not coincide due to the varying engine speed. Therefore, the **actual** time interval between the pilot and main injection will also vary. Specifically, the Creighton reference states:

> The basic timing requirements are that main injection should occur at approximately a fixed crank angle, and that pilot injection occur at approximately a fixed time, but a varying crank angle, before main injection. The timing signal for main injection can be obtained by a means exemplified by a cam, driven from the engine camshaft, and a switch means to initiate main injection at the desired crank angle. **However, pilot timing cannot be obtained directly from a cam on a variable speed engine because the switch means will operate at a given crank angle, and the time between pilot injection and main injection would vary with engine speed.** Because it is not possible to measure the time before an event occurs, it is necessary to predict the time of occurrence of the event. For this purpose, this invention includes a Pilot Leadtime Computer, described below, which predicts the time of main injection and **causes pilot injection to occur at a fixed time period before the predicted time of main injection**. (Creighton, col. 2, ll. 58-75, *emphasis added*).

> Basic timing is obtained from a cam attached to the engine camshaft and three switch means...The switches are located so that a predetermined crank angle is rotated between closure of the start switch means and the main switch means...**Closure of the main switch means initiates main injection**...The leadtime computer, on a given cycle, generates, a voltage proportional to the time between closure of the start switch means and the main switch means. **This voltage is stored ...[and] used to predict on the next cycle the time interval between closure of the start switch means and main injection...** The computer also generates a pilot lead voltage proportional to the **desired** fixed time interval between pilot and main

> injection. This pilot lead voltage is subtracted from the stored voltage by electronic or other means to **give a resultant voltage proportional to the computed time between closure of the start switch means and the instant at which pilot injection should occur**. (*Creighton*, col. 3, ll. 3-30, *emphasis added*).

Thus, the main injection occurs based on the position of the crankshaft, and the pilot injection occurs at the starting time of the previous main injection minus the desired fixed time interval. However, due to the varying engine speed, the timing of the main injection will vary from cycle to cycle. Thus, the actual time interval between the pilot and the main injection will also vary. Therefore, the Creighton reference does not disclose "a start of triggering of the second partial injection taking place a preselected first time period after an end of triggering of the first partial injection." Since the Creighton reference fails to disclose each and every claim limitation, it fails to anticipate Claim 1 and its dependent Claims 2-4 and 7. Therefore, Applicants respectfully request that this rejection be withdrawn.

Claims 5 and 6 stand rejected under 35 U.S.C. 103(a) as being unpatentable over the Creighton reference in view of United States Patent No. 5,188,084 to Sekiguchi ("the Sekiguchi reference").

According to the Office Action:

> Creighton applies as noted above and Sekiguchi teaches an injection pump which monitors an actual start of pump injection and corrects a signal to the timing setting valve to make the actual timing equal to the target timing. Note also that the quantity of injection is also set according to the timing of the beginning of injection.

Three basic criteria must be met to establish a *prima facie* case of obviousness. First, the prior art references must teach or suggest all the claim limitations. Second, the references or the knowledge generally available to one of ordinary skill in the art must provide some suggestion or motivation to modify the reference or to combine reference teachings. Third, there must be a reasonable expectation of success. M.P.E.P. § 2143.

Claims 5 and 6 depend from Claim 1. As described above, Creighton does not disclose "a start of triggering of the second partial injection taking place a preselected first time period after an end of triggering of the first partial injection." The Sekiguchi reference also does not disclose such an element. Since the Creighton and Sekiguchi references fail to teach or suggest all the claim limitations of claim 1, from which Claims 5 and 6 depend, they cannot render Claims 5 or 6 obvious under 35 U.S.C. §103(a). Therefore, Applicants respectfully request that this rejection be withdrawn.

CONCLUSION

In light of the foregoing, Applicants respectfully submit that all of the pending claims are in condition for allowance. Prompt reconsideration and allowance of the present application are therefore earnestly solicited.

Respectfully Submitted,

Dated: 11/15/02

BY: _____

Richard L. Mayer
Reg. No. Reg. No. 22,490
KENYON & KENYON
CUSTOMER NO. 26646

(by
Reg. No.
36,197)